

2003B133A  
1st OA dated 9/30/06  
Response dated 11/30/06

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**REMARKS**

Reconsideration of the application is respectfully requested.

Claims 1-59 are pending. Claims 1, 12 and 13 have been amended. Claim 8 and 54-58 have been canceled. Claim 8 has been incorporated into Claim 1. Pressure and temperature limitations have been added to claims 1 and 53. Support is found at pages 58-59 paragraphs [00146] and [00148]. New claim 59 is added. Applicants respectfully submit that no new matter has been added and no new issues raised.

This invention is directed toward a novel and unobvious polymerization process for the polymerization of monomers to provide copolymers such as isobutylene copolymers. In Applicants' efforts to improve the polymerization process it was discovered that if the polymerization were to be performed employing hydrofluorocarbon diluents the polymerization process was unexpectedly improved. The process' major improvement relates to the significant reduction in reactor fouling and also in reducing the use of methylchloride.

**Rejection Under 35 U.S.C. § 112**

Claims 12 and 13 have been rejected under 35 U.S.C. § 112, second paragraph as being indefinite. This rejection is now respectfully traversed in view of the amendment to these claims. It is respectfully submitted that the amendment removes any alleged indefiniteness from the claims. Withdrawal of the rejection is respectfully requested. Should the Examiner still find a problem with the claims a telephonic interview would be greatly appreciated.

**Rejection Under 35 U.S.C. § 102 (b)**

Claims 1-6, 11, 33, 35-43, 49-50, 52, 53, and 55-57 have been rejected under 35 U.S.C. § 102 (b) as being anticipated by Halasa. The Examiner relies on Example XIV (d). The Examiner suggests that Halasa discloses methods of polymerizing isoprene in the presence of a cobalt complex, triisobutyl aluminum, toluene and 2,3-difluorobutane. This rejection is respectfully traversed.

2003B133A

1st OA dated 9/30/06

Response dated 11/30/06

Halasa in Example XIV refers back to Example I and III. In each of Example I and III there is provided a toluene solution of  $\text{CoCl}_2$ . Co is a Group 9 element (and nickel is a group 10 element). In accordance with the instant claims the Lewis acid metal is from Groups 4, 5, 13, 14, or 15 of the Periodic Table. It is therefore respectfully submitted that the teachings of Halasa differ in kind from the inventive aspect disclosed in this application. Applicants' claims do not include either Ni or Co. Furthermore, Halasa clearly employs hydrocarbons as the reaction medium, not Applicant's *fluorinated* hydrocarbons (Col. 5, lines 48-60). Further, the halogenated hydrocarbons used in accordance with Halasa are catalyst modifiers not solvents or diluents and are thus present in extremely small amounts (50 to 5000 molar ratios to mole of cobalt or nickel, see column 2, line 13). Thus, Halasa's halogenated hydrocarbon is not present as a diluent at 5 to 100 volume % as required in Claim 1. Another major difference between Halasa and the instant invention is that the Al compounds of Halasa are employed as a reducing agent, not as a Lewis acid. Furthermore the polymerization examples are conducted at a temperature of  $30^\circ\text{C}$ . This too differs from Applicant's claimed invention where a temperature of less than  $0^\circ\text{C}$  is required. It is therefore respectfully submitted that the system of Halasa differs in kind from the system instantly claimed, and does not anticipate the claimed invention under 35 U.S.C. § 102(b).

Claims 52 and 55-58 have been rejected under 35 U.S.C. § 102(b) as anticipated by WO00/04061. Applicant respectfully disagrees, however to further prosecution, has canceled Claims 52 and 55-58. Applicant reserves the right to file a divisional application to the subject matter of claims 52 and 55-58. Withdrawal of the rejection is respectfully requested.

#### Rejection Under 35 U.S.C. § 103 (a)

Claims 26 and 27 have been rejected under 35 U.S.C. § 103 (a) as being unpatentable over Halasa. The Examiner cites Col. 4, line 67 through Col 5, line 26 as a disclosure which would motivate one in the art to select the Al compounds as a Lewis acid. This rejection is respectfully traversed. As discussed above, the catalyst system of Halasa differs in kind from that recited in the instant claims. It is unquestionable that the Al compounds of Halasa are

2003B133A

1st OA dated 9/30/06

Response dated 11/30/06

employed as reducing agents, not Lewis acids. Clearly, at Col. 4, line 52 and Col. 5, line 6, the compounds are all referred to as reducing agents. It is respectfully submitted that Lewis Acids as employed in the instant claims do not function as the Al compounds in combination with the Co or Ni compounds as disclosed in Halsas. Furthermore the HFC's in Halsas are catalyst modifiers and are thus present in small amounts. Nothing within the four corners of Halsas suggests using an expensive HFC as the diluent for the reaction instead of the cheap hydrocarbons taught at column 5, lines 48-60. Further nothing with Halsas suggest using an HFC as the diluent would help reduce fouling. Thus Applicant respectfully submits that the claimed invention is not obvious over Halsas. Withdrawal of the rejection is respectfully requested.

Claims 1-17, 26, 27, 33-53, and 55-58 have been rejected under 35 U.S.C. § 103 (a) as being unpatentable over US 5,780,565 (hereinafter Clough). The Examiner suggests that Clough discloses slurry polymerization comprising HFC compounds as solvents, in optional mixture with other solvents or gases. The Examiner states that Lewis acid catalysts together with cocatalyst are disclosed by Clough. The Examiner states that one of ordinary skill in the art would be motivated to use the recommended methods of the reference because they have been disclosed as effective methods of polymerization. This rejection is respectfully traversed.

When Clough's entire disclosure is read, it is clear that Clough is directed to super-atmospheric carbon dioxide polymerizations and focuses on one of the known problems of super-atmospheric carbon dioxide polymerizations, i.e. clumpy dispersions. Clough focuses on using a dispersing agent used to make the super-atmospheric carbon dioxide polymerizations work well. Specifically, Clough's examples are all run in supercritical CO<sub>2</sub> at 40 to 66 °C and about 5000 psi (34.6MPa) with a dispersing agent and the comparative example is run without the dispersing agent. To one of ordinary skill in the art reading the entire reference, Clough teaches that super-atmospheric CO<sub>2</sub> polymerizations are unstable at the higher pressures and require a dispersing agent to maintain the slurry. This is not Applicant's claimed invention.

Furthermore, while Clough also discloses many variations of: 1) catalysts (e.g. coordination (such as Ziegler-Natta or metallocene), free radical, cationic, ROMP, methasis,

2003B133A

1st OA dated 9/30/06

Response dated 11/30/06

anionic, etc; 2) solvents (carbon dioxide, HFC's, PFC's, noble gases, polyatomic gases, hydrocarbons, and mixtures thereof); 3) temperatures (-78 to 400°C), and 4) pressures (102 kPa to 690 MPa), Clough does not disclose Applicant's specific claimed combination of Group 4, 5, 13, 14 or 15 Lewis Acid, 5 to 100 vol% HFC, temperature less than 0 °C and pressure of 0 to 14,000 kPa. Nowhere within the four corners of Clough is there any suggestion, motivation or instruction to select one specific subgroup of Lewis acids (that are not even specifically named) *and* select specific solvent having 5 to 100 volume % HFC *and* select a temperature below 0°C *and* select a relatively low pressure of 14,000 kPa or less. This unique combination unexpectedly produces a slurry of polymer particles that do not foul and do not require a dispersing agent to maintain the slurry. The lack of motivation, instruction or suggestion in Clough is particularly apparent when one turns to the examples to find super-atmospheric CO<sub>2</sub> polymerizations operating at at least 40 °C and about 5000 psi (about 34.5 MPa). One of ordinary skill in the art would not look to Clough's super-atmospheric process for a low temperature, lower pressure, low fouling process. It is only with the benefit of the forbidden tool of hindsight provided by the instant application that one of ordinary skill in the art be motivated to selected the four specific elements from the broader disclosures in Clough and eliminate the dispersing agent to obtain Applicant's claimed invention. Applicant respectfully submits that the instant claims are not obvious in the sense of 35 U.S.C. §103 over Clough. Withdrawal of the rejection is respectfully requested.

Claims 1-5, 8-10, 14-18, 26, 27, 35, 37, 49, 50, 52, 53, 55, and 56 have been rejected under 35 U.S.C. §103 (a) as being unpatentable over US 5,728,783. (hereinafter Falchi). The Examiner suggests that Falchi discloses Lewis acids in hydrocarbons. The Examiner then states that one of ordinary skill in the art would be motivated to use the recommended methods of the reference because they have been disclosed as effective method of polymerization. This rejection is respectfully traversed. Falchi's polymerization process differs in kind from that instantly disclosed and claimed. There is no teaching in Falchi that one could employ HFCs in combination with a Lewis Acid to obtain a polymerization process having a significant reduction in reactor fouling. In fact, Falchi makes no distinction between HFCs and aliphatic, alicyclic and aromatic hydrocarbons (col. 5, lines 7 -14). There is

2003B133A  
1st OA dated 9/30/06  
Response dated 11/30/06

nothing within the 4 corners of Falchi that would suggest that by employing a HFC one obtained a polymerization process with significant reduction in reactor fouling. The use of Falchi as a reference involves picking and choosing from amongst a number of solvents. It is only with the benefit of hindsight provided by the instant application that one of ordinary skill in the art be motivated to employ HFCs as a solvent in place of the hydrocarbon solvent also disclosed in Falchi. In fact, Falchi states that "the sole requirement of the solvent is that it be polymerization grade for the catalyst system used." Such a teaching would not suggest that HFCs would be useful in obtaining a system which would manifest reduced fouling.

It is further respectfully submitted that Lewis acids as the system to cause polymerization, contrary to the Examiner's suggestion, are not disclosed in Falchi. In fact, all the examples in Falchi employ Ziegler/Natta type catalyst. Such catalysts are similarly disclosed at Col. 4, line 55 through Col. 6, line 44. It is again urged that the ordinary practitioner in the art could only pick and choose amongst all the Z/N catalyst and then conclude only with the benefit of the hindsight of this application to employ certain Lewis acids in combination with HFCs as a diluent to obtain a polymerization process manifesting reduced fouling. It is therefore respectfully requested that this rejection be removed.

#### **Double Patenting**

Regarding the double patenting rejections, Applicants respectfully submit that, due to the still-changeable nature of the claims, these rejections should be held in abeyance, e.g., until such point as the pending claims are allowable but for such double patenting rejections. At that juncture, Applicants will, if necessary, submit the appropriate terminal disclaimer(s) to obviate any then-pending double patenting rejections. Applicants respectfully submit that these rejections are not ripe for resolution until there are otherwise allowable claims in the instant case and allowed or issued claims in the cases to which terminal disclaimers are sought. Indeed, Applicants respectfully note that the M.P.E.P. instructs the Examiner to withdraw a provisional double patenting rejection in the earlier filed of two pending applications and to allow that earlier filed application to issue as a patent without a terminal disclaimer. See M.P.E.P. § 804(I)(B)(1).

2003B133A

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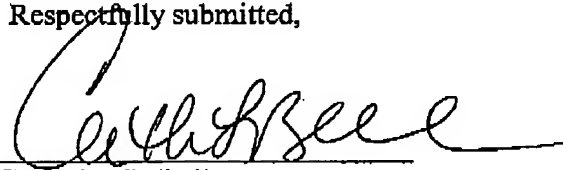
In view of the above amendments and remarks it is respectfully submitted that this application is in condition for allowance. Prompt notice of such is respectfully solicited.

Please charge any deficiency in fees or credit any overpayments during the entire pendency of this case to Deposit Account No. 05-1712.

Applicants invite the Examiner to telephone the undersigned attorney, if there are any issues outstanding which have not been presented to the Examiner's satisfaction.

Respectfully submitted,

11-30-06  
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